



Australian Bureau of Statistics

Education Services

Education Services home page > CensusAtSchool home page > Year 10 Resources

Resources



MAT 07 – Time Series Data of 15-24 Year Old Road Fatalities

You can download this activity and the teacher solutions as a rich text file (RTF) at the bottom of the page.

Subject Area

Mathematics

Overview

In this activity, students investigate and comment on the changes and trends in road fatality rates for a 10 year period. Optional activities include smoothing and graphing data as well as fitting a linear regression model to make predictions.

Requirements

- Access to the internet is desirable
- Access to CAS calculators or Excel
- Copy of student worksheet

Instructions

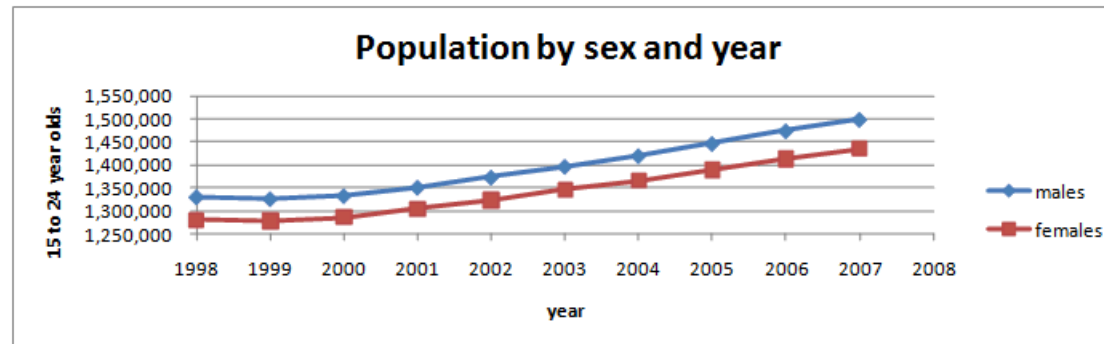
Time Series Data of 15-24 year Old Road Fatalities by Sex

The following table shows the population of 15-24 year olds in Australia.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007p
MALES 15-24	1,330,598	1,326,531	1,333,011	1,351,444	1,373,382	1,397,016	1,420,120	1,446,866	1,474,499	1,499,234
FEMALES 15-24	1,280,391	1,277,560	1,285,283	1,303,713	1,322,910	1,345,997	1,365,323	1,388,615	1,412,564	1,435,183
TOTAL	2,610,989	2,604,091	2,618,294	2,655,157	2,696,292	2,743,013	2,785,443	2,835,481	2,887,063	2,934,417

Table 1: Change in the Australian population for 15 – 24 year olds for the period 1998 – 2007. (2007 is a predicted value)
Source Catalogue no. 3105.0.65.001 Australian Historical Population Statistics, 2008 table 4.1

Because it has been regularly collected over time the data can be represented in a time series graph where any trend becomes easy to read.

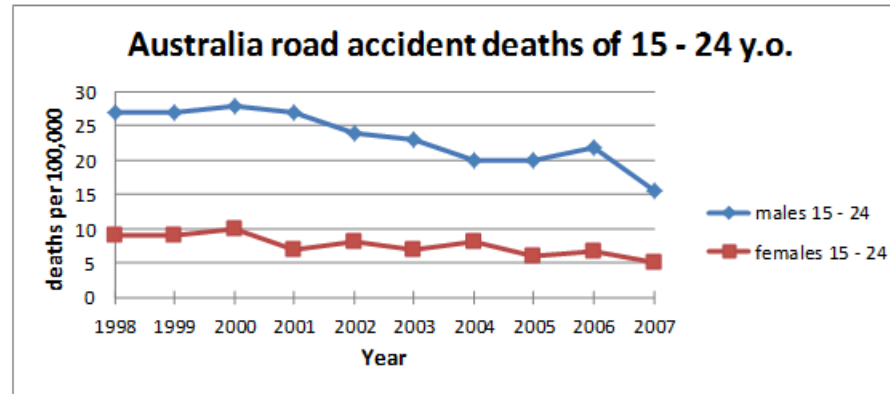


Task One: Population of males and females

1. Write a sentence describing how the population of 15 – 24 year olds in Australia has changed from 1998 to 2007.

Task Two: Road fatalities for males and females

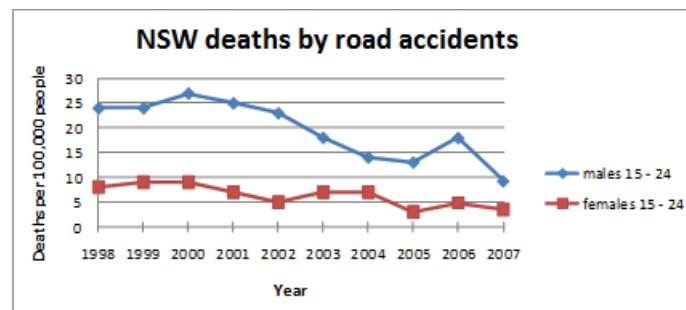
The following 9 time series graphs have been prepared using the Social Data Set Number **S15: Cause of Death by Motor Vehicle Accidents by Sex, 1998-2007** on the Education Services pages of the ABS. **Note** the rate expressed is per 100,000 in the 15-24 year old age group.

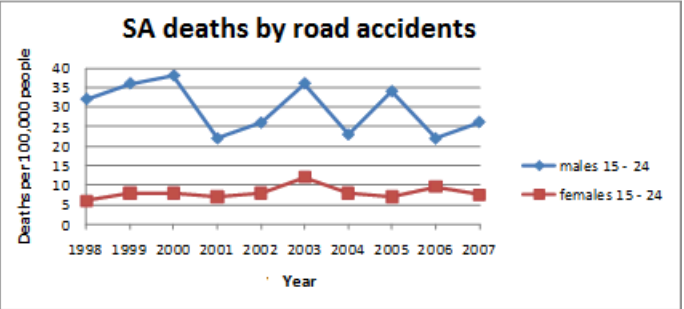
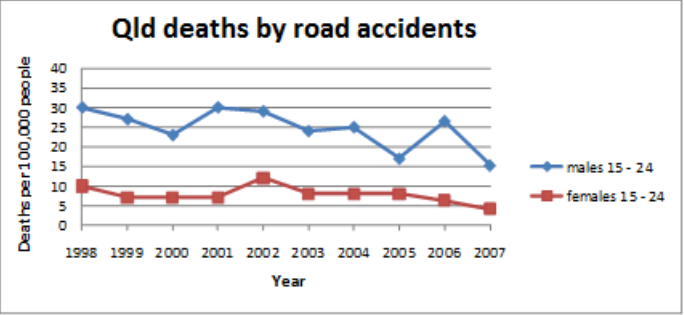
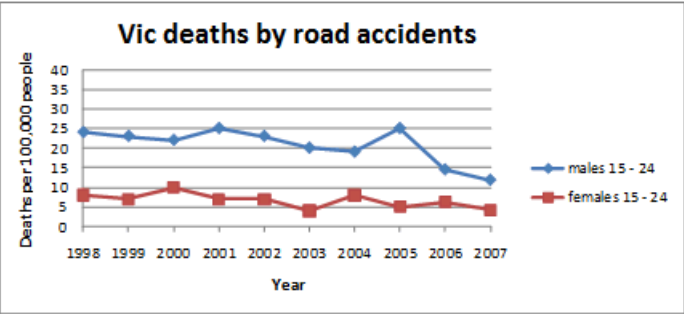


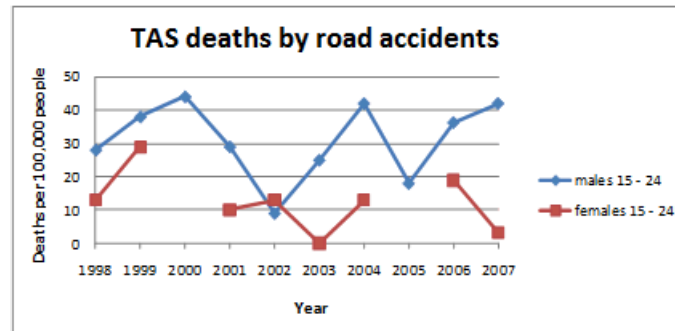
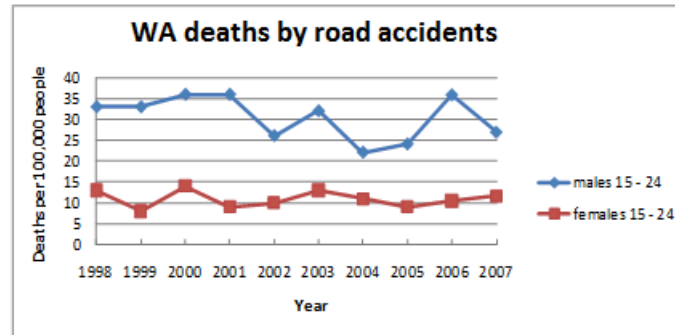
2. For the time series graph above, write a sentence describing any pattern or trend that is evident and any other points of interest.

Task Three: Comparison of road fatalities for males and females by state

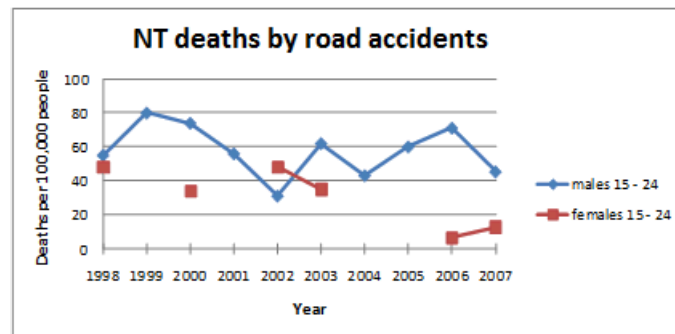
The graphs on the following pages show the rate of fatalities for 15 – 24 year old males and females by State and Territory.



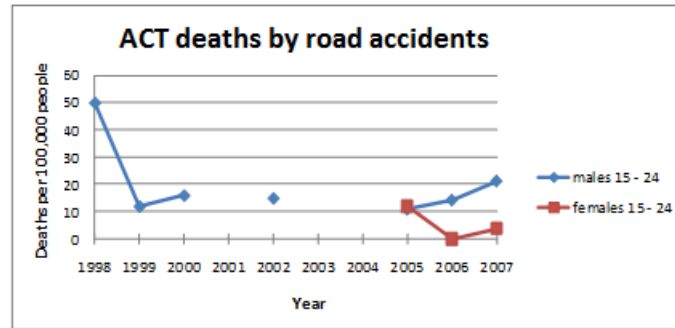




Note: Data for females in 2000 and 2005 not published



Note: Data for females in 1999, 2001, 2004 and 2005 not published



Note: Data for males in 2001, 2003 and 2004 and females 1998 - 2004 not published

3. Comment on any similarities and differences in the State and Territory graphs compared with the graph of Australia. Give possible reasons to explain your observations.

4. Select a State or Territory of interest to you. Comment on whether the rate of death is higher or lower than the National rate. Comment on any reasons there may be for this. Note insufficient information may be provided in the NT, SA and ACT graphs to complete a full comparison.

5. Use the population figures in Table 2 to calculate an estimate of the actual number of deaths in 1998 and 2007 for your chosen State or Territory for this age group. Show your answers in Table 3 and include examples of your working out. Note your results will be more accurate if you use the actual numbers in the S15 data set rather than reading the time series graphs. Discuss how the number of actual deaths has changed in this time.

	males			females		
	1998	2007	diff	1998	2007	diff
NSW	440,427	485,819	45,392	423,698	463,730	40,032
VIC	325,048	377,960	52,912	315,097	357,570	42,473
QLD	253,958	303,954	49,996	245,983	292,343	46,360
SA	101,035	110,956	9,921	96,391	105,474	9,083
WA	134,986	157,825	22,839	128,147	146,614	18,467
Tas	32,527	33,207	680	31,400	31,876	476
NT	16,260	17,387	1,127	14,719	16,135	1,416
ACT	26,204	28,259	2,055	24,846	26,542	1,696

Table 2 Population by State and Sex 1998 and 2007 (Catalogue no. 3201.0)

	males			females		
	1998	2007	diff	1998	2007	diff

NSW						
VIC						
QLD						
SA						
WA						
Tas						
NT						
ACT						

Table 3: Estimated number of actual road fatalities 15 - 24 per State 1998 and 2007

Extension

Task Four: Smoothing the Data

For your selected State or Territory,

- Use an appropriate method to smooth the data and graph the smoothed data.
- Fit a linear regression line (trend line) and interpret the equation in terms of the variables.
- Interpret the slope and y intercept of the regression line.
- Use the equation of the regression line to predict both the rate of deaths for 2005 and 2010.
- Comment on the accuracy of the regression line for making predictions.
- Comment on how you could attempt to improve the reliability of your predictions for your chosen State or Territory.

Downloads

Student Worksheet

RTF

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